CSc Practical Worksheet 2(Solution)

A'S
Paper 1

Topic: Assembly Language 2

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1 The Von Neumann model uses a series of registers.

(a) Explain what is meant by the term **register**.

Registers are the temporary storage of data, which are considered as a small piece of memory

(b) (i) Explain the purpose of the Memory Data Register (MDR).

Stores / holds data / instruction when fetched from memory
Stores / holds data which is being written to memory

(ii) Name **two** registers, other than the MDR, that are used in the fetch-execute cycle.

Register 1 **CIR**

Register 2 .**MAR/MDR**

(c) X is a register. The current contents of X are:

1	0	0	0	0	1	1	1

(i) The current contents of register X represent an unsigned binary integer.

Convert the value in X into denary.

135

(ii) The current contents of register X represent a Binary Coded Decimal.

Convert the value in X into denary.

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(iii) The current contents of register X stores a two's complement binary integer.

Convert the value in X into denary.

-121

2 a) The Accumulator is a register. The current contents of the Accumulator are:

1	1	0	1	1	0	1	1

The current contents of the Accumulator represent an unsigned binary integer.

(i) Convert the value in the Accumulator into denary.

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(ii) Convert the value in the Accumulator into hexadecimal.

DB

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(iii) The current contents of the Accumulator represent a two's complement binary integer.

Convert the value in the Accumulator into denary.

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(b) The binary integer represents a character from the computer's character set.

(i) Define the term **character set**.

A list of characters recognised by the computer hardware and software

(ii) Explain the differences between the **ASCII** and **Unicode** character sets.

UNICODE has greater range of characters than ASCII
UNICODE represents most written languages in the world while ASCII does not ASCII used for English only
ASCII uses 7 or 8 bits or one byte whereas UNICODE uses up to 4 bytes per character

(iii) The ASCII code for 'A' is 41 in hexadecimal.

Calculate the ASCII code in hexadecimal for 'Z'. Show your working.

Working :

Code for Z = Code for A + 25_{10}
Code for Z = 41_{16} + 25_{10}
Code for Z = 41_{16} + 19_{16}
Code for Z = $5A_{16}$

ASCII code in hexadecimal for 'Z' : **$5A_{16}$**

(a) H is a register. The current contents of H are:

1	1	0	0	0	0	0	1

The current contents of register H represent an unsigned binary integer.

(i) Convert the value in register H into denary.

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(ii) Convert the value in register H into hexadecimal.

C1

(iii) The current contents of register H represent a two's complement binary integer.

Convert the value in register H into denary.

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(iv) State why register H does not currently contain a Binary Coded Decimal (BCD).

The first 4 bits / first nibble (would give 12 which) is > 9 / 2 digits (which is not valid for BCD)

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